ECONOMIC TRANSITION IN CENTRAL AND EASTERN EUROPE AND THE FORMER SOVIET UNION: WHICH POLICIES WORKED*

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ABSTRACT: This paper employs a conditional growth convergence framework to reassess the link between growth and structural reform in the 1991-2000 transition process of Central and Eastern Europe and the Former Soviet Union. We find that the dominant link between transition indicators and growth is negative. There is clear evidence that price liberalisation, enterprise reform and competition policy are negatively associated with growth. By contrast, only trade liberalisation has a significant positive association with growth, but no significant link is found between growth and financial sector reforms.

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The former Soviet Union and eastern European states in the 1990s saw the transition from socialism to capitalism, and the consequent economic shift from centrally planned to market economies. This transition, in contrast to the economic transformation of China and Vietnam, was at first accompanied by a significant output decline, followed in the second half of the 1990s by a slow recovery. It was characterised by a very complex process of transformation in institutions, economic structures and behaviour (Martha De Melo, Denizer Cevdet and Alan Gelb 1996). That process, a traverse between economic systems, has been so rare that initially there was no relevant economic theory. But at an empirical level a literature has emerged that explores the links between transition and growth (De Melo, Cevdet and Gelb 1996; Paul Brenton, Gros Daniel and Vandille Guy 1997; Andrew Berg, Eduardo R. Borensztein, Ratna Sahay, and Jeromin Zettelmeyer, 1999; Philippe Aghion and Mark Schankerman 1999; Louise Grogan and Luc Moers 2001; Elisabetta Falcetti, Martin Raiser and Peter Sanfey 2002; Bruno Merlevede 2003; and Elisabetta Falcetti, Tatiana Lysenko and Peter Sanfey 2005). This literature has tried to link progress, as measured by European Bank for Reconstruction and Development (EBRD) transition indicators, to growth - though the precise causality is elusive.

Initial conditions, macroeconomic stability, and institutional and hence structural change are the main concerns in the transition literature (Falcetti, Raiser, and Sanfey 2002; Falcetti, Lysenko and Sanfey 2005). Both the mainstream growth literature and the recent studies of transition economies show that initial conditions are inversely related to growth – widely understood as conditional growth convergence (Robert J. Barro and Xavier Sala-i-Martin 1992; Gregory N. Mankiw, David Romer, and David N. Weil 1992; Brenton, Izvorski and Van Rooden 1998; Gary Krueger and Marek Ciolko 1998; Berg, Borensztein, Sahay, and Zettelmeyer 1999; Stanley Fischer and Ratna

Sahay 2000; De Melo, Denizer, Gelb and Teney 2001; Falcetti, Raiser, and Sanfey 2002).

There is little disagreement that macroeconomic stability, measured by the inflation rate, is strongly and positively related to growth (Robert J. Barro 1997, p.13-19; Brenton, Izvorski and Van Rooden 1998; Berg, Borensztein, Sahay, and Zettelmeyer 1999; Fischer and Sahay 2000; and Barro and Sala-i-Martin 2003, p.461-496). Moreover, the investment decision is an important component of the growth literature. Mankiw, Romer and Weil (1992); Sala-i-Martin (1997); and Barro and Sala-i-Martin (2003) demonstrate positive links between growth and the ratio of investment (saving) to GDP, though the causality is sometimes disputable (Barro 1997).

However, there is less agreement on how to measure institutional or structural change. But assessing specific structural changes, which are mainly driven by exogenous policy changes, is also of interest because as the evolution of policy reforms can be arrayed on a scale related to the degree they mimic the development of economic systems, they can be used to compare governments' performance. However, policy changes are not necessarily exogenous, as some are responses to economic performance.

Transition indicators, such as those for liberalisation, privatisation, enterprise reform, and financial institutions, measure an economy's institutional structure and thus are likely to reflect the evolution of policy reforms. Most studies (De Melo, Cevdet and Gelb 1996; Brenton, Gros, and Vandille 1997; Aghion and Schankerman 1999; Berg, Borensztein, Sahay, and Zettelmeyer 1999) have found a positive correlation between growth and these indicators. Yet what most scholars and citizens of transition states remember is the economic decline that accompanied the first phases of substantial transition.

We argue that economic performance may be affected by both the level of a transition policy – the level effect, and by its change rate – the speed effect. The conventional wisdom is that an increase in the level of structural reform, to more closely mimic an advanced market system, automatically raises output. But in practice, policies that are effective in one system may require some adaptation to succeed in another. For example, they likely require a change in social and individual behaviour. Mistakes were inevitable and hence lessons had to be learnt in a unique trial and error process. So in itself a change of policy from one level to another does not necessarily lead to immediate growth.

The speed effects due to the change rate of a transition policy may also have positive or negative output consequences. In the early transition years negative speed effects appeared to be common, as the destruction of the old system was dramatic, in contrast to the relatively slow development of the new system. De Melo, Cevdet and Gelb (1996), using switching regressions, gave the first econometric account. Oleh Havrylyshyn, Ivailo Izvorski and Ron Van Rooden (1998), Berg, Borensztein, Sahay, and Zettelmeyer (1999) and Merlevede (2003), using lagged regressions, also provided evidence for negative early speed effects, though they cautioned that the results were not robust.

It is inefficient to employ a single policy variable to represent both level and speed effects in a lagged specification - especially when the data period is as short as a decade. Some researchers assume that current and several lagged values of a variable can capture respectively the immediate and long run effects. But there is no prior information to help identify the lag order, and the short data series and loss of degrees of freedom make it impractical to conduct a test for lag order.

We propose an alternative approach where the transition policy index variable reflects the level effect, and the rate-of-change of the policy index captures the speed

effect. A similar rate-of-change variable was studied by Berta Heybey and Peter Murrell (1999). Unfortunately they neglected the level variable. In the light of our framework, it is likely that while they picked up the costs of transition, they probably underestimated benefits.

Introducing a speed variable as well as a level one has at least three advantages. First, the speed - a change rate - is a unit free measurement. Second, it can indicate the volatility of the policy change. Finally, at minimum data cost it allows an investigation of short-run effects or policy shocks. Many previous studies, based on level variables, likely focus on the benefits of transition, but few addressed the costs that are more likely to be reflected by the corresponding speed variables.

Moreover, the institutional or structural change is multi-dimensional and ought to be measured by a range of transition indicators. Indicators vary in importance and hence picking a single indicator would likely distort the real picture of the transition process. Clearly we need a general model encompassing a range of policies indicated by a group of transition indicators. But few earlier studies explore this route, partly due to data availability and partly due to concerns about potential problems from multicollinearity.

This paper tackles these issues, using panel data methods. Our focus is on the possible relationship between transition indicators and growth, not only because these indicators have practical policy importance, but also because they provide a comparative basis to assess economic performance. We embed the relationship in a conditional growth convergence literature. Conditioning it on commonly used variables – initial conditions, inflation and investment – provides a benchmark interpretation of the transition experience.

I. METHODOLOGY

Our framework follows the conditional growth convergence approach widely used in the growth literature (Barro and Sala-i-Martin 1992; Mankiw, Romer and Weil 1992; Barro and Sala-i-Martin 1995; Francesco Caselli, Gerardo Esquivel, and Fernando Lefort 1996; Barro 1997; Barro and Sala-i-Martin 2003). This involves a regression of per capita growth rates on an initial condition plus a number of additional explanatory variables. We focus on the level and speed transition variables, generated from EBRD transition indicators, which largely represent exogenous policy choices. As some assert that the transition indicators are endogenous (Heybey and Murrell 1999; Campos and Corricelli 2002; Merlevede 2003), we formally test their exogeneity.

We use the initial condition, inflation rate, and the investment to GDP ratio to capture the convergence mechanism, partly because the three control variables behave consistently in both the growth and the transition literatures, and partly because of the data limitations in transition economies. For the annual data employed in this study, the initial condition, measured by per capita output in the previous period, is used to capture the output level of the economy[1],

The limitations of transition data force us to use annual data over a decade, though the conditional convergence framework has previously been used to study variations in five-year and even ten-year average data for much longer periods, partly due to concerns about business cycle effects, partly due to the data restriction on education variables. But annual data allows the full use of information, and business cycle effects can be controlled in part by the use of inflation and investment variables, and in part by the use of an array of time dummies, in a two-factor panel data specification. We further examine the possible effects of inflation and investment variables. The education variables are not addressed here for the limitation of data.

Panel data methods are extensively used in empirical growth studies, and also in some transition papers (De Melo, Cevdet and Gelb 1996; Brenton, Izvorski and Van Rooden 1998; Berg, Borensztein, Sahay, and Zettelmeyer 1999; Fischer and Sahay 2000; Falcetti, Raiser, and Sanfey 2002; Merlevede 2003). They help to reduce small sample problems and thus the possible problem of multicollinearity. Within the conditional convergence framework, our panel data model is specified as:

(1) $$r_{i,t} = \beta_0 + \beta_1 \cdot X_{i,t} + \beta_2 \cdot Z_{i,t} + \beta_3 \cdot r_{i,t}^{Z} + u_{i,t}$$

$$i = 1, 2, \ldots, N \text{ and } t = 1, 2, \ldots, T$$

where $r_{i,t}$ is the change rate of real output; i and t denote respectively countries and periods; $X_{i,t}$ is the vector of control variables; $Z_{i,t}$ is the set of transition indicators - the level variables; and $r_{i,t}^{Z}$ is the corresponding change rate of $Z_{i,t}$ - the speed variables; β_0, β_1, β_2 *and* β_3 are parameters; and $u_{i,t}$ is the error term that can be further decomposed into a two-factor error components disturbances specification:

(2) $$u_{i,t} = d_i + d_t + v_{i,t}$$

$$i = 1, 2, \ldots, N \text{ and } t = 1, 2, \ldots, T$$

the dummies d_i are the unobservable individual country effects, d_t are the associated unobservable time effects, and $v_{i,t}$ is an independent stochastic error term.

Treating error components d_i and d_t differently results respectively in fixed effects and random effects models. In the fixed effects case, only $v_{i,t}$ is an independent stochastic error term. d_i is allowed to capture the individual country effect and d_t to reflect the time difference – a dynamic property. Both d_i and d_t are assumed to be fixed parameters that can be estimated in the model using least squares dummy variables (LSDV).

The random effects model treats d_i and d_t and $v_{i,t}$ as stochastically independent disturbances. It can be estimated by generalised least squares (GLS). However, the random effects model is not statistically superior to the corresponding fixed effects model, though it has some appealing properties, such as modelling ethnic, religious, and colonial dummies. In practice a comparison can be made using the Hausman Lagrange multiplier (LM) chi-squared statistic (Jerry Hausman 1978). A large value of the Hausman statistic favours the fixed effects model.

With a large number of variables, multi-collinearity and hence the robustness and consistency of estimates might became a problem (Ross Levine and David Renelt 1992; Edward F. Leamer 1983; 1985). Sala-i-Martin (1997) has argued that as pure robustness of parameter estimates seldom exists, we should, while retaining the concept, opt for a wider comparison of parameter significance levels. Carmen Fernandez, Eduardo Ley and Mark Steel (2001) support this view.

We investigate robustness parsimoniously in a two-stage process. In the first stage, we use partial regression to study each transition indicator conditioned on the common control variables within the conditional growth convergence framework. The transition indicator is decomposed into two components - level and speed variables. This can help provide some primary information and also avoid the possibility of multicollinearity between the transitional variables.

We examine the exogeneity of the transition indicators, employing a Hausman test – also known as the Durbin-Wu-Hausman test. Endogeneity is of wide concern in empirical studies, and of increasing interest in studies of transition economies (Heybey and Murrell 1999; Campos and Corricelli 2002; Merlevede 2003). But there are few empirical studies that test for the problem. When the exogeneity of a variable is rejected, we tackle it with a two-stage instrumental variables LSDV regression.

The second stage conducts a general to specific reduction process, incorporating the core ideas of robust analysis from Levine and Renelt (1992) and Sala-i-Martin (1997). All the variables are pooled in a regression defined by (1) and (2). The reduction process uses the following procedures and criteria:

i. Start with the general regression. All the transition variables are classified by their level of significance. Attention focuses both on the variables with less than a certain significance level, say 10%, and on the least significant variable.

ii. Remove the least significant variable in the regression, and then check the impact of this on the initially significant variables. The least significant variable can be deleted if all of the initially significant variables remain so. Otherwise the insignificant variable is retained.

iii. Repeat step ii for the next least significant variable, and then continue until all variables are above the chosen significance level, or until the removal of any beneath that level pulls those above it, beneath it.

iv. Conduct a joint F-test (asymptotically equivalent LM or likelihood ratio (LR) test) on the deleted insignificant variables to examine whether the model reduction process was statistically not inappropriate.

v. Practically the deleted variables can be used as instruments to deal with endogeneity issues. Alternative instruments are lagged variables.

The reduced form is likely to have several advantages over the general framework. Its fewer variables reduce the risk of multicollinearity and increase the degrees of freedom. The screening process for variables and consequent model evolution increases the efficiency of parameter estimates. The plausibility of the model evolution process can be easily tested by an F test or equivalent LM and LR in step (iv). The further discussions largely rely on the results from the second stage analysis.

II. DATA DESCRIPTION

GDP growth rates, annual inflation rates and transition indicators are from EBRD annual Transition Reports (EBRD 1995; 1996; 1997; 1998; 1999; 2000; 2001; 2002). Investment as a share of GDP is from World Bank Annual Reports and World Bank Development Indicators (World Bank 2000). The real GDP per capita at purchasing power parity (PPP) in 1995 US dollars makes use of EBRD annual real growth rates, World Bank data on 1995 GDP at PPP, and population.

The EBRD's Transition Report (2002) contains 37 series of indicators organised into seven dimensions. For three dimensions: infrastructure, legal environment, and the social sector there is little data. So we concentrate on the remaining four dimensions: liberalisation, privatisation, enterprises, and financial institutions - selecting two indicators for each dimension. Table I lists all variables in three categories

Twenty-five out of twenty-seven transition economies dealt with by the EBRD are included. Bosnia-Hertzgovina, and Serbia and Montenegro are excluded, due to data availability. The data set generally covers 1991-2000, though with a few gaps. A model with two period lagged variables further loses the first two period data points. Economic transition was in fact launched in different countries at different times (EBRD 2000) and the early years were important in reflecting and shaping the character of the transition. Poland and Hungary began in 1989, followed in 1990 by the rest of Central and Eastern Europe (CEE) and South Eastern Europe (SEE) excluding Albania. Albania and the three Baltic States began the process in 1991, followed the next year by the twelve members of the Commonwealth of Independent States. Therefore 1991-2000 data provides a good test of transition regularities. EBRD transition indicators were introduced in 1997 and recorded by the integers 1 to 4, with pluses and minuses, valued

for aggregation at 0.3, indicating slightly better or worse achievements. The 1991-1996 indices were added retrospectively by EBRD in 2000.

Table II presents the correlation matrix for the variables. The correlations between growth and the levels of the transition indicators are positive, but those between growth and the changes in the transition indicators are negative. The absolute values of the former correlations are larger than those of the latter, except for price liberalisation. While the correlation coefficient between growth and inflation is large and negative, those between growth and both the initial condition and the investment share are small and respectively positive and negative. Clearly, the latter two correlation signs, associated with initial condition and investment, seem to be inconsistent with the consensus in the conventional growth convergence literature.

III RESULTS AND IMPLICATIONS

Table III presents the results of the first stage analysis - the partial regressions. Clearly, the two-way fixed panel data method is statistically preferable over alternative specifications. For instance, the F-test statistics for fixed country and time dummies show that fixed effects are significant. Meanwhile, the Hausman test statistics for the competition from random effects reject the random effects specification.

All three control-variables are statistically significant with the expected sign, which is consistent across alternative models, though the convergence coefficients seem to be too large. This primarily indicates that the conditional growth convergence framework is suitable to address the transition process. The abnormally large convergence coefficients will be explained later.

The coefficients of the transition variables reveal some striking results. As can be seen, all the other four significant coefficients, except for that of the level of trade

liberalization, are negative. The only significant positive coefficient is on the level of trade liberalization. It, at 0.0165, is the smallest of the five significant coefficients. In contrast, the magnitude of the speed of price liberalisation, at 0.0734, is more than double that of any other transition variable. This suggests a clear negative association between economic transition and growth.

The endogeneity diagnosed by the Hausman exogeneity test is found in the level and the speed of trade liberalisation, the speed of small-scale privatisation, the level of enterprise reform, and banking sector reform. But the exogeneity of all three control-variables is not rejected. The Hausman test uses all the insignificant transition variables as instruments, for the insignificant variables are less correlated with the dependent variable but more likely associated with transition variables. Clearly the insignificant variables are part of the whole package of transition policies, in which these transition policies are likely to be interdependent. Alternatively we can use the lagged variables as instruments, with which trade liberalisation and enterprise reform are diagnosed as endogenous. The drawback of the alternative approach is the reduction of the sample size and increase in the number of the instruments. In practice, choosing appropriate instrumental variables is often open to challenge, even though the Sargan over-identification test can be used to examine the choice.

To tackle the endogeneity issues, we re-estimate the model with instrumental variables using two-stage LSDV methods. The instruments are the same as those for the exogeneity test. The results are reported in table IV. As can be seen, all the significant coefficients are negative and there are no significant positive coefficients reported. However, the results in table IV are not very consistent with their counterparts in table III. This is likely due to the recovery of the information embedded in those instruments, in particular, when the number of instrumental variables is relatively large. In addition, the Sargan over-identification tests are also reported and do not reject the instruments.

Table V reports the results of the second stage analysis - the model reduction from general to specific form. Panels V.A and V.B are respectively the model specifications of the general and the specific equation. The model evolution from the general to the specific is statistically consistent and acceptable. As can be seen, the significance levels for most parameters increase from the general to specific form, which suggests that the evolution process is stable and consistent. Second, the adjusted R^2 suggests that the reduced form panel V.B fits the data better than the general one that contains more variables. Third, the small F test statistic for the joint restrictions on the reduced form also suggests that the reduction leading to the specific form is not statistically inappropriate. Fourth, the two F-test statistics for fixed country and time dummies show these fixed effects are significant. But the Hausman test statistic for the random against fixed effects does not strongly reject the random effects model, even in the reduced form.

More interestingly, five of six significant transition variables are negative and again only the level of trade liberalisation is significantly positive. This is rather consistent with the first stage result. In addition there is no evidence of endogeneity problems in the explanatory variables of panel V.B. For comparison, we re-estimated panel V.B using two-stage LSDV with two alternative instruments. The results are presented in panels V.C and V.D. Again the Sargan over-identification test does not reject the application of instruments. We discuss the implications of the results in greater detail later.

Finally, as a sensitivity analysis, excluding two control variables – the inflation rate and the investment ratio - does not significantly alter the general results of the transition variables. An example is provided in Panel V.E - an alternative regression of panel V.B. This helps rule out the possible risk that the co-movement of the control variables in the annual data might distort the results of the transition process.

III.B. Control Variables: Initial Condition, Inflation Rate and Investment Ratio

The three control variables, to some extent, help to reveal the convergence property of the transition economies. Tables III, IV and V show all the three control variables are significant with the signs expected in the mainstream literature. The hypothesis of conditional convergence and a positive relation between growth and investment are well captured by the suggested models.

The coefficients on the initial condition, usually interpreted as the convergence coefficients, are in a range from 0.146 to 0.204. They are very large in comparison to those of around 2.5% suggested by Barro and Sala-i-Martin (1992), Markiw, Romer and Weil (1992), Barro (1997) and Barro and Sala-i-Martin (2003). However, Nazrul Islam (1995), and Caselli, Esquivel and Lefort (1996) report higher convergence coefficients in the range 0.056-0.098 estimated from more preferable panel data methods. It is argued that most economies are usually not very far from their steady states.

The large convergence coefficients reported here can be understood from two aspects. On the one hand they are likely in part to reflect some type of "recovery" phenomenon, in which output rebounds from the unjustifiably large output falls of the early transition period. Falcetti, Lysenko and Sanfey (2005) identify this type of phenomenon. On the other hand, a systematic downward estimate of the output, would result in an overestimate of the convergence coefficient. Friedrich Schneider and Dominik H. Enste (2000) show transition economies have large unreported economies, relative to the advanced market economies.

There is a positive link between the inflation rate, reflecting macroeconomic stability, and growth. More specifically a high inflation rate signals a lack of government control over fiscal and monetary policy, which can not only destroy the confidence of investors but also distort the market mechanism. The hyperinflation rates

observed in transition economies have been widely seen as one of the causes of economic recession during the 1990s (Berg, Borensztein, Sahay, and Zettelmeyer 1999). In contrast, Campos and Corricelli (2002) argue that inflation is likely to be the result of particular policies. But we have not found statistical evidence for the endogeneity of inflation.

The significant positive link between investment share and growth is also widely reported in the growth literature, but the direction of causality is contested (Blomstrom, Magnus, and Zejan. 1996; Barro 1997; Barro and Sala-i-Martin 2003). For the transition economies, the initial output slump and high inflation severely damaged investor confidence. So it seems reasonable to posit an initial causation running from growth to investment. However, our results do not reject a causality running from investment to growth.

To sum up, the results from three control variables provide a rather consistent and convincing source of information on the transition economy, which is in line with the general growth literature. However in table II the simple correlation coefficients between growth and the control variables likely disguise a more complex reality. Taken together the results for the control variables firmly place the findings for these transition economies in the mainstream of empirical growth studies.

III.C. Liberalisation of Prices and Trade

Liberalisation is a core issue in the transition literature. This paper examines two aspects – price and trade liberalisation. It provides more detailed and hence more accurate information than the previously used Cumulative Liberalisation Index (CLI) of De Melo, Cevdet and Gelb (1996). The CLI was a weighted average of three indicators, reflecting internal markets, external markets, and private sector entry. By contrast we explore price and trade liberalisation as well as other policies, in much greater detail.

Both tables III and V report significant negative coefficients for the speed variable of price liberalisation, though its levels are insignificantly negative, and hence it was removed in the second stage analysis. As can be seen, the magnitudes of its speed variable are much larger than those of other significant transition variables. This result is consistent in both stages of the analysis, which suggests that price liberalisation was accomplished at a significant economic cost – a transition cost. The policy implication is that price liberalisation is not straightforward and rapid change is not directly beneficial. This view is strengthened as price liberalisation in transition economies has also likely led to the higher inflation that we have already shown damages growth.

In contrast, the second stage results suggest that trade liberalisation has a significant positive level effect but an insignificant negative speed effect, though these are not completely consistent with the first stage results. The significant positive level effect is consistent with typical "Washington Consensus" advice. A negative speed effect may reflect the fact that in the early stages of the switch from plan to market foreign firms were better able to seize business opportunities. An extreme example of such liberalisation is the collapse of East German manufacturing in the wake of reunification. Even in less spectacular circumstances, a very rapid switch from administered to market prices, where the former bore little relation to real resource costs or relative demands, can result in widespread large absolute and relative price changes. The profitability of enterprises changes dramatically and many collapse or significantly reduce their scale of output. Lobbying for state subsidies increases, but the tax base shrinks. Liberalisation in the foreign sector also leads to increased foreign competition, intensifying the contractionary effects of domestic liberalisation.

Trade liberalisation is found to be endogenous in the first stage analysis. As can be seen in table III, the level and speed of trade liberalisation failed to pass the Hausman exogeneity test. It suggests that trade liberalisation is partly a consequence of the

transition process. Table IV provides an alternative estimate with instruments that pass the Sargan specification test. As can be seen, the sign of the level variable of trade liberalisation turns negative, though insignificant, while its speed becomes significant. These results may be caused by instrumental variables, for which we likely recover the information embedded rather than deliver a consistent estimate. As a result, the two-stage LSDV with instruments may reveal the overall negative association between growth and transition indicators.

III.D. Privatisation of Small-scale and Large-scale Enterprises

Privatisation exhibits overall negative effects on economic growth in both the two stages. Tables III and V show that the speed variable of small-scale privatisation is significant and negative. But its level effect is insignificant and disappears in the general-to-specific process. By contrast, the level effect of large-scale privatisation is significantly negative in the general to specific process, though it is insignificant in the first stage analysis. Its speed effect is insignificant in both stages.

For the transition experiences related, it is likely to expect a negative link between large-scale privatisation and growth, as rapid privatisation creates major social costs in the forms of unemployment, ill health, and poorer housing provision. Furthermore, large-scale privatisation often ends in bankruptcy, though efficiency gains may be achieved by surviving firms. As privatisation may leave both firms and government with excess labour to support, this dampens both actors` ability to restructure. Even if only the profitable parts of firms are retained, in the first instance output will fall. In the longer run output may rise as the profitable divisions expand, and that might account for the positive sign on the speed variable – getting the process over more quickly pays dividends.

The negative coefficient on the speed of small-scale privatisation likely reflects the transition costs to small-scale businesses. Yet the swift shift from planned to market systems leaves most of the small firms too little time to adapt to the market, let alone learn practical management and marketing skills. As a result, small-scale businesses have to bear tremendous costs from the lessons of their own mistakes, which largely absorb the expected benefits from small-scale privatisation.

Interestingly, the speed of small-scale privatisation is also found to be endogenous. As can be seen in table III, it cannot pass the Hausman test. This result suggests that small-scale privatisation is likely to be determined by the transition process. Unfortunately, the two-stage LSDV estimates reported in the panels IV.B and V.C do not provide consistent results.

III.E. Enterprise Reform and Competition Policy

Tables III and IV show that enterprise reform is negatively related to growth, but the significance of the enterprise reform variables are not consistent. By contrast, a significant level effect from competition policy is consistently reported, but its speed effects are insignificantly positive and thus dropped in the general to specific process. A possible interpretation is that enterprise reform and competition policy produces much more pain than gain in the first stage of transition period.

Enterprise reform mainly reflects enterprise restructuring and corporate governance. Blanchard (1997) singled out restructuring as a key mechanism of transition, noting that improving productivity may also decrease employment. If restructuring is rapid then inefficient units are quickly disbanded, and while productivity in the remaining ones may rise, overall output may fall. Our results suggest that this is exactly what happened.

Hardening the budget constraint is another key element of enterprise reform. Under planning, soft budget constraints and a complete absence of competition were the norm. So initially managers had neither experience of binding financial constraints, nor of fending off rivals. Even potentially profitable firms were thus vulnerable to their lack of experience of market discipline, and the more rapid was restructuring, the greater the risk.

Both enterprise reform and large-scale privatisation were policies aimed solely at state owned enterprises. We have already argued that the negative coefficient on the large-scale privatisation policy variable probably reflects the huge costs of layoffs in a low productivity economy. So both policy variables are picking up different aspects of the same story. The effects of competition policy, which should foster the growth of the private sector, will reinforce the negative impacts of other policies on the output of the former state sector. But here, although there is some weak evidence for this in the general regression equation, this result does not survive the general to specific process.

III.F. Reform of Financial Institutions

Banking and non-banking reform aims to produce financial institutions consonant with a market economy. Financial reform was needed to produce an efficient change in the form of assets – by channelling private savings into investment. It was also needed to generate an effective clearing system. Non-banking reform was required to ensure the growth of the complementary range of financial products that provide more efficient inter-temporal production and consumption – from insurance to pensions. Although both sets of reforms might have been expected to increase growth, tables III and V show little convincing evidence of this link. Indeed all the level coefficients on these reform variables are negative, though none is significant.

Neither banking nor non-banking reform were early priorities for transition economies. Moreover the financial system under planning had limited and quite different functions to that of a market system. The functions were to check the progress of plan fulfilment, to deliver working and investment capital according to the plan, and to collect the private savings and channel them to the state, for consumption or investment. The system was a mono-bank, with no investment appraisal capabilities. After transition began the state banks were generally subjected to little competition and privatisation was often politically difficult. Although there was then a rapid growth in the numbers of new private banks, many were under-capitalised, and some, as offshoots of large cash strapped companies, did not always lend prudently. In any case the considerable uncertainty of the early transition years, allied to limited investment appraisal skills, encouraged banks to invest in government and foreign bonds, or to speculate on the stock exchanges, rather than to focus on domestic lending. In addition many states continued to use their banking system as a conduit for soft loans and other types of subsidies, as they had under planning. Consequently bad loans threatened the solvency of the system, and periodic restructuring imposed high costs on taxpayers, depositors and sometimes banks` owners. More recently tighter regulatory and supervisory regimes and increasing foreign bank penetration have significantly improved the performance of financial sectors. But given the late arrival of such improvements it is not surprising that our analysis records no significant positive effects from financial sector reforms.

IV. COMPARISON AND EXTENSION

This section further examines both a methodological issue and a stability issue. First we compare our results with those from a lagged regression. Then we investigate a possible stability issue around 1995 by splitting the sample.

IV.A. Comparison with Alternative Lagged Regressions

In the literature there are two alternatives to our methodology. These are switching regressions (De Melo, Cevdet and Gelb 1996), and lagged regressions (Brenton, Izvorski and Van Rooden 1998; Merlevede 2003). The switching approach uses dummy variables to capture policy impacts over a certain period. This technique can be used on a single policy, but it is impossible to apply it to a continuous reform process with a range of different policies in operation.

The lagged regressions employ current and two lagged terms of the policy variables to examine the policy effects. Brenton, Izvorski and Van Rooden (1998) found negative coefficients for the current year variables, and in some regressions positive coefficients for the following two lagged periods. But when more variables were introduced those results were not robust. Other drawbacks were the difficulty of identifying the lag order from a short data series, and sacrificing the early part of the series. The latter issue resulted in the loss of both degrees of freedom and information, which was of particular concern as the early transition period was likely to be the most important for understanding reform impacts on growth. Finally, by itself a lagged regression is unable to distinguish speed effects from level effects.

To compare alternative models, for simplicity, we examine price liberalisation. Table VI presents the results from three alternative specifications. Panel VI.A provides the comparator that follows our methodology. As can be seen, the three control variable estimates are again consistent and robust across the three different specifications.

However the estimated parameters of the policy variable are different across panels. As can be seen, analogous to the work of Brenton, Izvorski and Van Rooden (1998) and Merlevede (2003), panel VI.B suggests an immediate negative impact from increased price liberalisation, followed by two positive effects in the two subsequent periods, though the second one is insignificant. The summation of the two significant coefficients appears to suggest an overall negative effect from price liberalisation. However, that of all three coefficients provides the opposite result. This is rather confused.

Now if we add a speed effect, as in panel VI.C, the coefficient on the speed variable is the largest with a negative sign, and has the largest t value amongst the four price liberalisation variables, though all the four variables become insignificant. The sum of the coefficients of the three level variables is negative, which is consistent with the results of panel VI.A. Above all, these results suggest that the speed variable does reveal important information, and that the comparator specification is competitive with the lagged versions.

IV.B. Evidence of Stabilization after 1995

By the end of the first half of the 1990s, with rapid price liberalisation, most if not all of the technically easy and politically acceptable policies had been implemented, and further progress in that dimension would have required freeing public utility prices, and eliminating politically sensitive subsidies. By the mid 1990s it was widely accepted that prudent fiscal and monetary policies were necessary to avoid the damaging consequences of high and variable inflation rates. As a result, wild movements in macroeconomic aggregates, and often brutal but rapid transition progress were replaced by stabilisation packages and incremental changes in transition indicators. There was further turmoil and backsliding – most spectacularly in the Russian crash of 1998 – but

the character of the transition process had changed. It is worth seeing if the data reflect that change.

Using a large number of dummies in the panel data analysis vitiates the widely used Chow test for coefficients' stability or a structural shift, especially when an LSDV analysis is employed. Instead, general comparisons are possible by splitting the sample, and then comparing the results from sub-samples with the full sample equation. Table VII presents the estimates, where again we concentrate on a partial regression with the most promising policy variable, price liberalisation.

Although there are clear differences between the two sub-periods, most properties remain consistent. In the early transition period, the destructive speed effect of price liberalisation on growth is significant, though its level and the impact of inflation are insignificant. In the second period both the level and the speed of price liberalisation variables are insignificant. This suggests a less damaging impact in the second period. In addition, the greater sum of squared errors during 1991-1995 with a relative small sample confirms the relatively greater volatility of the first period, and thus the relative stability of the second period. The extreme volatility of inflation in the first period may even account for our failure, against the logic of the analysis of this section, to discover a significant link to growth.

V CONCLUSIONS

This paper uses the framework of conditional growth convergence to examine the impact of transition policies on economic growth conditioned on three robust control variables. It decomposes eight transition indicators into two sets of variables - level and speed, and then investigates them using general-to-specific as well as partial regression in a two-stage analysis.

The dominant link between transition indicators and growth is found to be generally negative. There is clear evidence that the price liberalisation, enterprise reform, and competition policy are negatively associated with growth. It is argued that given the specific conditions during the transition, such effects could have been expected. By contrast, trade liberalisation has a positive association while no significant link is found between growth and financial sector reforms.

We should be clear what these results mean. They do not imply that in well functioning market systems there is no positive output effect from price liberalisation, competition policy, privatisation, enterprise or financial sector reform. They do imply that, taken as a whole, and given the ways in which such structural changes were made in transition states during 1991-2000, there was no identifiable output benefit to the policies. Our results do not imply that transition states cannot or will not benefit from such structural reforms. They do imply that they did not benefit during the first decade of transition.

The transition reform results are placed in the context of the standard empirical growth literature by including three control variables. These show a consistently significant negative link between inflation and growth; an explained fast convergence rate; and a positive link between growth and the ratio of investment to GDP. Taken together these factors are more consistent and determining than the structural reform policies.

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TABLE I - DESCRIPTION AND SELECTION OF VARIABLES

Code	Variable Description	Category			
		Dependent	Control	Level	Speed
R	Per capita growth rate of GDP (PPP)	√			
X_1	Log of GDP per capita lagged one period		√		
X_2	Log of annual inflation rate		√		
X_3	Investment share in GDP		√		
Z_1	EBRD index of price liberalisation			√	
r^{Z_1}	Change rate of Z_1				√
Z_2	EBRD index of trade liberalisation			√	
r^{Z_2}	Change rate of Z_2				√
Z_3	EBRD index of small-scale privatisation			√	
r^{Z_3}	Change rate of Z_3				√
Z_4	EBRD index of large-scale privatisation			√	
r^{Z_4}	Change rate of Z_4				√
Z_5	EBRD index of enterprise reform			√	
r^{Z_5}	Change rate of Z_5				√
Z_6	EBRD index of competition policy			√	
r^{Z_6}	Change rate of Z_6				√
Z_7	EBRD index of banking sector reform			√	
r^{Z_7}	Change rate of Z_7				√
Z_8	EBRD index of reform of non-banking financial institutions			√	
r^{Z_8}	Change rate of Z_8				√

TABLE II - CORRELATION MATRIX

	r	X_1	X_2	X_3	Z_1	r^{Z_1}	Z_2	r^{Z_2}	Z_3	r^{Z_3}	Z_4	r^{Z_4}	Z_5	r^{Z_5}	Z_6	r^{Z_6}	Z_7	r^{Z_7}	Z_8	r^{Z_8}
r	1.000	-0.069	-0.658	-0.034	0.313	-0.541	0.464	-0.326	0.537	-0.411	0.434	-0.181	0.456	-0.191	0.293	-0.173	0.451	-0.173	0.378	-0.022
X_1	-0.069	1.000	-0.079	0.263	0.025	0.004	0.262	-0.051	0.194	0.041	0.305	0.016	0.348	-0.022	0.337	0.013	0.361	0.024	0.336	0.084
X_2	-0.658	-0.079	1.000	-0.029	-0.377	0.399	-0.632	0.313	-0.652	0.387	-0.593	0.234	-0.635	0.209	-0.380	0.177	-0.658	0.252	-0.462	0.058
X_3	-0.034	0.263	-0.029	1.000	-0.197	0.101	-0.176	-0.071	-0.183	-0.049	0.031	0.022	0.056	-0.097	0.161	0.054	0.023	-0.020	0.161	0.031
Z_1	0.313	0.025	-0.377	-0.197	1.000	-0.056	0.710	-0.062	0.670	-0.115	0.570	0.064	0.557	0.117	0.395	-0.049	0.606	0.142	0.383	0.038
r^{Z_1}	-0.541	0.004	0.399	0.101	-0.056	1.000	-0.231	0.471	-0.345	0.249	-0.282	0.170	-0.304	0.038	-0.202	0.054	-0.298	0.060	-0.237	0.015
Z_2	0.464	0.262	-0.632	-0.176	0.710	-0.231	1.000	-0.045	0.817	-0.226	0.723	-0.064	0.755	0.004	0.481	-0.085	0.817	0.005	0.544	0.081
r^{Z_2}	-0.326	-0.051	0.313	-0.071	-0.062	0.471	-0.045	1.000	-0.238	0.342	-0.213	0.362	-0.222	0.266	-0.167	0.111	-0.231	0.268	-0.262	0.027
Z_3	0.537	0.194	-0.652	-0.183	0.670	-0.345	0.817	-0.238	1.000	-0.256	0.800	-0.100	0.773	-0.089	0.570	-0.060	0.798	-0.107	0.624	0.040
r^{Z_3}	-0.411	0.041	0.387	-0.049	-0.115	0.249	-0.226	0.342	-0.256	1.000	-0.288	0.311	-0.248	0.175	-0.200	0.148	-0.270	0.125	-0.309	0.045
Z_4	0.434	0.305	-0.593	0.031	0.570	-0.282	0.723	-0.213	0.800	-0.288	1.000	-0.035	0.781	-0.104	0.652	-0.079	0.774	-0.138	0.671	0.020
r^{Z_4}	-0.181	0.016	0.234	0.022	0.064	0.170	-0.064	0.362	-0.100	0.311	-0.035	1.000	-0.120	0.268	-0.141	0.144	-0.084	0.306	-0.275	0.035
Z_5	0.456	0.348	-0.635	0.056	0.557	-0.304	0.755	-0.222	0.773	-0.248	0.781	-0.120	1.000	0.086	0.695	-0.022	0.888	-0.073	0.727	0.067
r^{Z_5}	-0.191	-0.022	0.209	-0.097	0.117	0.038	0.004	0.266	-0.089	0.175	-0.104	0.268	0.086	1.000	-0.110	0.235	-0.007	0.537	-0.172	0.125
Z_6	0.293	0.337	-0.380	0.161	0.395	-0.202	0.481	-0.167	0.570	-0.200	0.652	-0.141	0.695	-0.110	1.000	0.115	0.615	-0.146	0.753	-0.009
r^{Z_6}	-0.173	0.013	0.177	0.054	-0.049	0.054	-0.085	0.111	-0.060	0.148	-0.079	0.144	-0.022	0.235	0.115	1.000	-0.010	0.179	-0.076	0.127
Z_7	0.451	0.361	-0.658	0.023	0.606	-0.298	0.817	-0.231	0.798	-0.270	0.774	-0.084	0.888	-0.007	0.615	-0.010	1.000	0.064	0.711	0.042
r^{Z_7}	-0.173	0.024	0.252	-0.020	0.142	0.060	0.005	0.268	-0.107	0.125	-0.138	0.306	-0.073	0.537	-0.146	0.179	0.064	1.000	-0.178	0.046
Z_8	0.378	0.336	-0.462	0.161	0.383	-0.237	0.544	-0.262	0.624	-0.309	0.671	-0.275	0.727	-0.172	0.753	-0.076	0.711	-0.178	1.000	0.146
r^{Z_8}	-0.022	0.084	0.058	0.031	0.038	0.015	0.081	0.027	0.040	0.045	0.020	0.035	0.067	0.125	-0.009	0.127	0.042	0.046	0.146	1.000

Data are from 1991 to 2000 and total observations are 225.

TABLE III - PARTIAL REGRESSIONS

		Panel III.A	Panel III.B	Panel III.C	Panel III.D	Panel III.E	Panel III.F	Panel III.G	Panel III.H
Constant term		1.472 (6.26)***	1.418 (6.18)***	1.446 (6.40)***	1.568 (6.18)***	1.618 (7.30)***	1.552 (7.17)***	1.528 (7.05)***	1.463 (6.53)***
Ln (GDP per capita one period lagged)		-0.172 (6.32)***	-0.175 (6.43)***	-0.176 (6.55)***	-0.180 (6.67)***	-0.183 (6.83)***	-0.175 (6.52)***	-0.177 (6.51)***	-0.169 (5.85)***
Ln (Inflation rate)		-0.0451 (5.56)***	-0.0385 (3.95)***	-0.0446 (4.97)***	-0.0517 (5.94)***	-0.0538 (5.83)***	-0.0472 (5.63)***	-0.0514 (5.38)***	-0.0475 (5.56)***
The ratio of Investment to GDP		0.0019 (2.81)***	0.0014 (1.99)**	0.0015 (2.03)**	0.0015 (2.09)**	0.0013 (1.80)*	0.0016 (2.24)**	0.0014 (1.95)*	0.0014 (1.91)**
Price liberalisation	Z_1	-0.0109 (0.76)							
	r^{Z_1}	-0.0734 (4.40)***							
Trade liberalisation	Z_2		0.0165 [E] (1.66)*						
	r^{Z_2}		-0.0296 [E] (2.35)**						
Small-scale privatisation	Z_3			0.0134 (1.08)					
	r^{Z_3}			-0.0348 [E] (2.02)**					
Large-scale privatisation	Z_4				-0.0184 (1.50)				
	r^{Z_4}				0.0083 (0.54)				
Enterprise reform	Z_5					-0.0288 [E] (1.50)			
	r^{Z_5}					-0.0129 (0.76)			
Competition policy	Z_6						-0.039 (2.23)**		
	r^{Z_6}						0.0073 (0.41)		
Banking sector reform	Z_7							-0.0101 [E] (0.64)	
	r^{Z_7}							0.0054 (0.31)	
Non-banking financial reform	Z_8								-0.0160 (1.00)
	r^{Z_8}								0.0195 (1.06)
Adjusted R^2		0.672	0.643	0.640	0.635	0.641	0.642	0.632	0.634
F-test of fixed country and time effects		3.581 (0.000)	4.102 (0.000)	3.666 (0.000)	4.313 (0.000)	4.293 (0.000)	4.416 (0.000)	4.283 (0.000)	4.138 (0.000)
Hausman's test of fixed against random effects		15.01 (0.010)	15.95 (0.007)	16.53 (0.005)	20.64 (0.001)	20.92 (0.001)	20.70 (0.001)	18.95 (0.002)	20.92 (0.001)
Durbin-Wu-Hausman test on exogeneity		--	19.70 (0.000)**	4.66 (0.031)**	--	10.26 (0.001)***	--	4.63 (0.032)**	--

Superscript [E] denotes rejection of the exogeneity of the corresponding variable. t-statistics in parentheses, with * significant at 10%, ** at 5% and *** at 1%. All test statistics are reported with p-values in parentheses.

TABLE IV - PARTIAL REGRESSION WITH INSTRUMENTAL VARIABLES

		Panel IV.A	Panel IV.B	Panel IV.C	Panel IV.D
Constant term		1.799 (7.08)***	1.476 (6.47)***	1.975 (7.95)***	1.588 (7.32)***
Ln (GDP per capita one period lagged)		-0.204 (7.35)***	-0.178 (6.59)***	-0.193 (7.32)***	-0.162 (5.78)***
Ln (Inflation rate)		-0.0504 (4.31)***	-0.0484 (5.24)***	-0.0775 (6.41)***	-0.0716 (5.13)***
The ratio of Investment to GDP		0.0011 (1.62)	0.0016 (2.23)**	0.0013 (1.81)*	0.0016 (2.17)**
Transition variables					
Trade liberalisation	Z_2	-0.0177 (1.06)			
	r^{Z_2}	-0.0752 (3.45)***			
Small-scale privatisation	Z_3		0.0057 (0.44)		
	r^{Z_3}		0.0832 (1.32)		
Enterprise reform	Z_5			-0.1455 (3.32)***	
	r^{Z_5}			0.0370 (1.56)	
Banking sector reform	Z_7				-0.0841 (2.06)**
	r^{Z_7}				0.0376 (1.57)
Adjusted R^2		0.660	0.636	0.657	0.639
Sargan's specification test on instruments		2.211 (0.988)	2.479 (0.981)	2.792 (0.972)	2.744 (0.974)

t-statistics in parentheses, with * significant at 10%, ** at 5% and *** at 1%. All test statistics are reported with p-values in parentheses.

TABLE V - GENERAL-TO-SPECIFIC REGRESSION

Explanatory Variables			Panel V.A	Panel V.B	Panel V.C	Panel V.D	Panel V.E
Constant term			1.313 (4.944)***	1.256 (5.844)***	1.263 (4.562)***	1.317 (5.540)***	0.998 (4.478)***
Ln (GDP per capita one period lagged)			-0.146 (4.829)***	-0.147 (5.740)***	0.151 (5.605)***	-0.150 (5.106)***	0.122 (4.666)***
Ln (Inflation rate)			-0.0336 (3.322)***	-0.0344 (3.845)***	0.0375 (3.633)***	-0.0367 (2.932)***	--
The ratio of Investment to GDP			0.0024 (3.218)***	0.0023 (3.356)***	0.0022 (3.136)***	0.0024 (3.248)***	--
Transition Variables	Price liberalisation	Z_1	-0.0168 (1.028)	--	--	--	--
		r^{Z_1}	-0.0670 (3.600)***	-0.0769 (4.829)***	-0.0778 (4.982)***	-0.0722 (4.409)***	-0.0770 (4.720)***
	Trade liberalisation	Z_2	0.0286 (2.442)**	0.0165 (1.080)	0.0241 (2.529)**	0.0213 (0.931)	0.0364 (4.026)***
		r^{Z_2}	-0.0048 (0.320)	--	--	--	--
	Small-scale privatisation	Z_3	-0.0103 (0.740)	--	--	--	--
		r^{Z_3}	-0.0400 (2.320)**	-0.0362 (2.006)**	-0.0324 (2.033)**	0.0759 (1.224)	-0.0334 (1.960)*
	Large-scale privatisation	Z_4	-.0.0268 (2.097)**	-0.0176 (1.429)	-0.0203 (1.787)*	-0.0150 (1.089)	-0.0112 (0.939)
		r^{Z_4}	0.0179 (1.129)	--	--	-	--
	Enterprise reform	Z_5	-0.0086 (0.402)	--	--	--	--
		r^{Z_5}	-0.0229 (1.136)	-0.0254 (1.785)*	-0.0270 (1.960)**	-0.0331 (2.150)**	-0.0355 (2.424)**
	Competition policy	Z_6	-0.0376 (2.086)**	-0.0321 (2.110)**	-0.0342 (2.335)**	-0.0334 (2.081)**	-0.0372 (2.419)**
		r^{Z_6}	0.0122 (0.670)	--	--	--	--
	Banking sector reform	Z_7	-0.0029 (0.169)	--	--	--	--
		r^{Z_7}	-0.0045 (0.220)	--	--	--	--
	Non-banking financial reform	Z_8	-0.0134 (0.837)	--	--	--	--
		r^{Z_8}	0.0097 (0.549)	--	--	--	--

TABLE V – (CONTINUED)

Explanatory Variables	Panel V.A	Panel V.B	Panel V.C	Panel V.D	Panel V.E
Adjusted R^2	0.690	0.697	0.681	0.688	0.655
F-test of fixed country effects	4.054 (0.000)	4.663 (0.000)	--	--	--
F-test of fixed time effects	2.010 (0.041)	1.902 (0.054)	--	--	--
Hausman's test of fixed against random effects (LM test)	16.51 (0.623)	14.59 (0.103)	--	--	--
F-test for joint restriction on reduced Panel V.B against V.A	0.542 (0.863)		--		
Sargan's specification test on instruments	--	--	1.338 (0.931)	1.964 (0.999)	--

The regression method is two-way LSDV. Panel V.C uses the omitted transition variables as instrumental variables, and alternatively panel V.D uses lagged variables as instruments; t-statistics in parentheses, with * significant at 10%, ** at 5% and *** at 1%. All test statistics are reported with p-values in parentheses. Sargan's specification test is the chi-squared statistic.

TABLE VI - COMPARISON OF ALTERNATIVE SPECIFICATIONS

Specification		Panel VI.A	Panel VI.B	Panel VI.C
Constant term		1.472 (6.26)***	1.443 (6.049)***	1.428 (6.23)***
Ln (GDP per capita one period lagged)		-0.172 (6.32)***	-0.174 (6.40)***	-0.170 (6.23)***
Ln (Inflation rate)		-0.0451 (5.56)***	-0.0416 (4.996)***	-0.0428 (5.10)***
The ratio of Investment to GDP		0.0019 (2.81)***	0.0020 (2.896)***	0.0021 (2.949)***
price liberalisation	Z_1	-0.0109 (0.76)	-0.056 (3.491)***	-0.0244 (0.752)
	$Z_1(-1)$	--	0.046 (2.815)***	0.010 (0.280)
	$Z_1(-2)$	--	0.013 (1.029)	0.013 (1.034)
	r^{Z_1}	-0.0734 (4.40)***	--	-0.0495 (1.122)
Adjusted R^2		0.672	0.671	0.671
F-test of fixed country and time effects		3.581 (0.000)	3.752 (0.000)	3.512 (0.000)
Hausman's test of fixed against random effects		15.01 (0.010)	17.04 (0.009)	15.41 (0.031)

TABLE VII – COMPARISON OF VOLATILITY

Data set		**1991-2000**	**1991-1995**	**1996-2000**
Constant term		1.472 (6.26)***	2.076 (4.08)***	3.471 (6.416)***
Ln (GDP per capita one period lagged)		-0.172 (6.32)***	-0.254 (4.25)***	-0.406 (6.46)***
Ln (Inflation rate)		-0.0451 (5.56)***	-0.0180 (0.919)	-0.0323 (3.090)***
The ratio of Investment to GDP		0.0019 (2.81)***	0.0024 (2.23)**	0.0020 (1.609)**
Price liberalisation	Z_1	-0.0109 (0.76)	-0.0118 (0.63)	-0.0371 (1.639)
	r^{Z_1}	-0.0734 (4.40)***	-0.0584 (2.598)**	-0.0177 (0.266)
Sum of squared errors		0.5794	0.2988	0.1076
Adjusted R^2		0.672	0.651	0.465
F-test of fixed country and time effects		3.581 (0.000)	2.617 (0.001)	3.743 (0.000)
Hausman's test of fixed against random effects		15.01 (0.010)	13.51 (0.019)	20.87 (0.000)
Observations		225	102	123

[1] Several types of initial conditions have been discussed in the transition literature (Shleifer 1997; Krueger and Ciolko 1998; Berg, Borensztein, Sahay, and Zettelmeyer 1999; and Fischer and Sahay 2000). However, per capita output or income is pre-dominant in the growth literature.